Interlaboratory comparison of methodologies for measuring the angle of incidence dependence of solar cells - DTU Orbit (28/10/2019)

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The aim of this work is to compare angle of incidence (AOI) measurement setups for solar cells between laboratories with such capability. For the first time, we compare relative light transmission measurements among eight laboratories, whose measurement techniques include indoor and outdoor methods. We present the relative transmission measurements on three 156 mm x 156 mm crystalline-Si (c-Si) samples with different surface textures. The measurements are compared using the expanded uncertainties provided by each laboratory. Five of the eight labs showed an agreement better than ±2% to the weighted mean between AOIs from -75° to 70°. At AOIs of ±80° and ±85°, the same five labs showed a worst case deviation to the weighted mean of -3% to 5% and 0% to 18%, respectively. When measurement uncertainty is considered, the results show that measurements at the highest incidence angle of ±85° are problematic, as measurements from four out of the six labs reporting uncertainty were found non-comparable within their stated uncertainties. At 85° AOI a high to low range of up to 75% was observed between all eight laboratories.

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